Reviving Conservation Values in Agro-commodity Landscapes: The Case of Gunung Tarak Landscape, West Kalimantan, Indonesia

Highlights

1. One major land-use development in the Gunung Tarak Landscape (GTL) in West Kalimantan Province, Indonesia has been the expansion of oil-palm plantations since the early 2000s, at the expense of forest and secondary regrowth areas.
2. The areas of High Conservation Value (HCV) identified at the landscape scale in GTL show a substantial decline between 2000 and 2016, with the relatively stable areas being only in official Protected Areas and Protection Forests; some of the losses resulted in ecological disconnection.
3. Remaining landscape HCV areas in 2016 in Oil-Palm Management Units (OPMUs) were few in comparison to those in the year 2000, before large-scale expansion of oil palm took place.
4. Identified HCV areas in GTL are a useful reference for further conservation planning, including the establishment of ecological corridors at a landscape scale and also for more detailed HCV identification in OPMUs.

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Introduction

Gunung Tarak Landscape (GTL) covers 506,000 ha in both Ketapang (368,000 ha or 73%) and Kayong Utara districts (138,000 ha or 27%), in West Kalimantan Province, Indonesia. The landscape has experienced massive changes in land use, as has also been observed elsewhere in Ketapang District and the province. Global market demand for palm oil has driven rapid expansion of oil-palm plantations in West Kalimantan; by 2017 there were 221 oil-palm companies which in total covered 1.5 million ha [1, 2]. Ketapang District reacted aggressively to the demand by issuing a high number of permits, causing large-scale expansion of oil-palm plantation areas [3]. Natural ecosystems in GTL have been massively reduced, including peatland ecosystems that cover approximately one-third of the landscape (Figure 1). The remaining peatland ecosystems are Sungai Putri Forest Block (SPFB) and Pematang Gadung Forest Block (PGFB), which are home to important habitats of orangutan (Pongo pygmaeus wurmbii) and store a large amount of carbon.

The High Conservation Value (HCV) approach has been widely applied as a method for the identification of conservation and protection areas in production management units, such as oil palm or industrial timber plantations. The approach also has the potential to be applied at wider spatial scales, such as landscape or jurisdictional territories [4]. Intensive and rapid development of plantations and agricultural practices in a landscape might result in fragmented forest cover; landscape HCV can be applied to identify patchy areas and provide an area overview for restoring connectivity.

Six categories of HCVs can be distinguished, covering aspects of biodiversity, landscape dynamics, endangered ecosystems, environmental services, community needs and cultural values [5,6].

This Info Brief summarises the application of HCV at the landscape level, which, together with the assessment of land-use/-cover dynamics, serves as evidence for the need for conservation and protection in GTL. We took into account HCV1–HCV4 and excluded HCV 5–6 because we focused on values of natural ecosystems that can be assessed at the landscape scale through secondary spatial data analyses. Land use/land cover and HCVs were assessed for a 16-year time span (2000–2016) in order to observe the changes, including the types of changes, where they happened and what caused the changes. Although the HCV approach was widely recognised only in the late 2000s, we applied HCV categorisation and terminologies for the 2000 data, and analysed the 2000–2016 changes. Subsequently, observation focused on the loss of HCV areas inside the OPMUs.

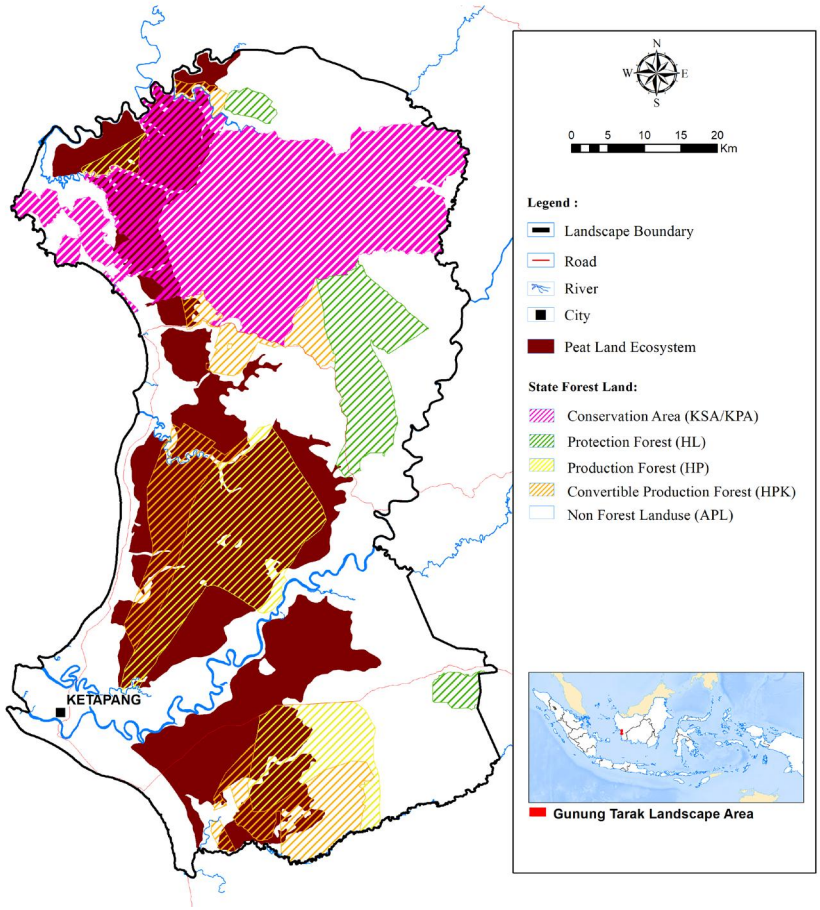


Figure 1. The Gunung Tarak Landscape (GTL) in West Kalimantan, Indonesia and state-forest land designation

Land use and land cover changes in 2000 - 2016

Over the 16-year period, forest cover in GTL decreased from 319,000 ha in 2000 to 217,000 ha in 2016 (Figure 2).

The 32% loss of forest cover in 16 years was dominated by the change to oil-palm plantations (15%) (Figure 3(a)). Changes to scrub (11 %) and cleared lands (2%) were caused by timber extraction and clearing of forest cover, mainly as a transition to other land-use types, such as oil palm or other agricultural practices.

Land-cover classes in 2000 that became oil-palm plantations in 2016 were mostly scrub (48%) and forest cover (36%) (Figure 3(b)), the latter encompassing degraded peat-swamp forest and degraded dryland forest.

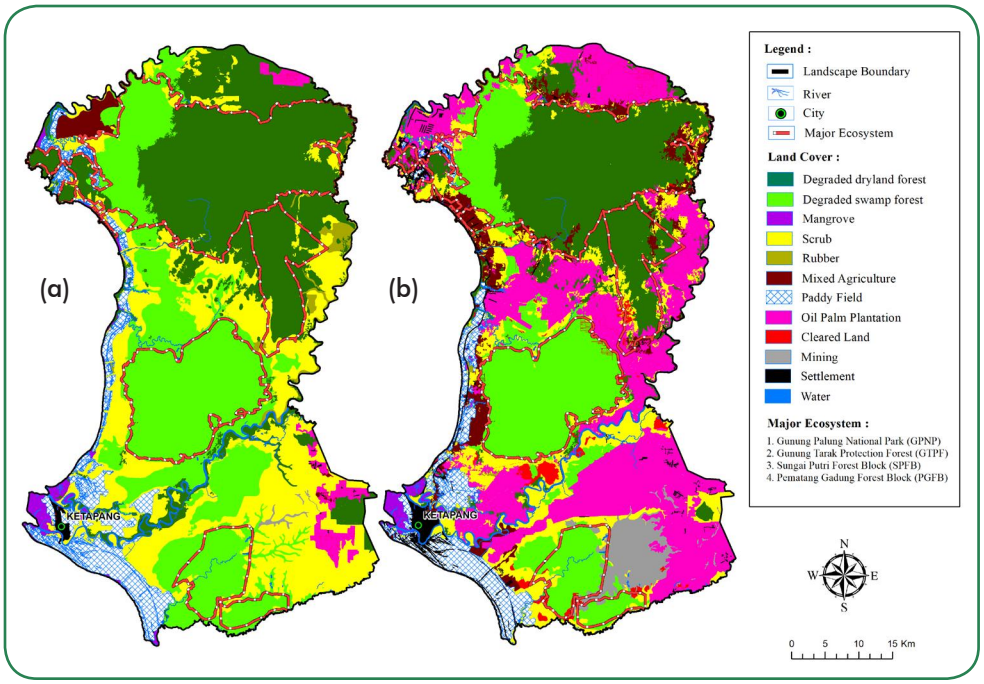


Figure 2. Land-cover map of GTL: (a) 2000; (b) 2016

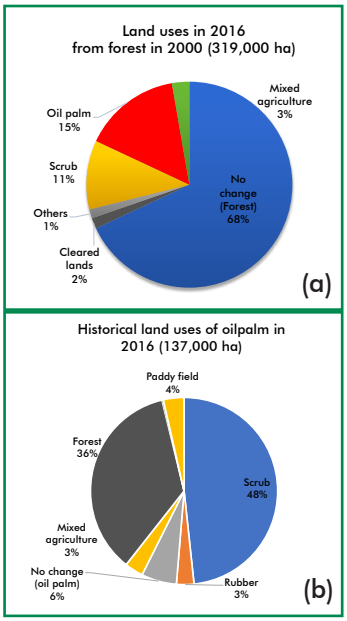
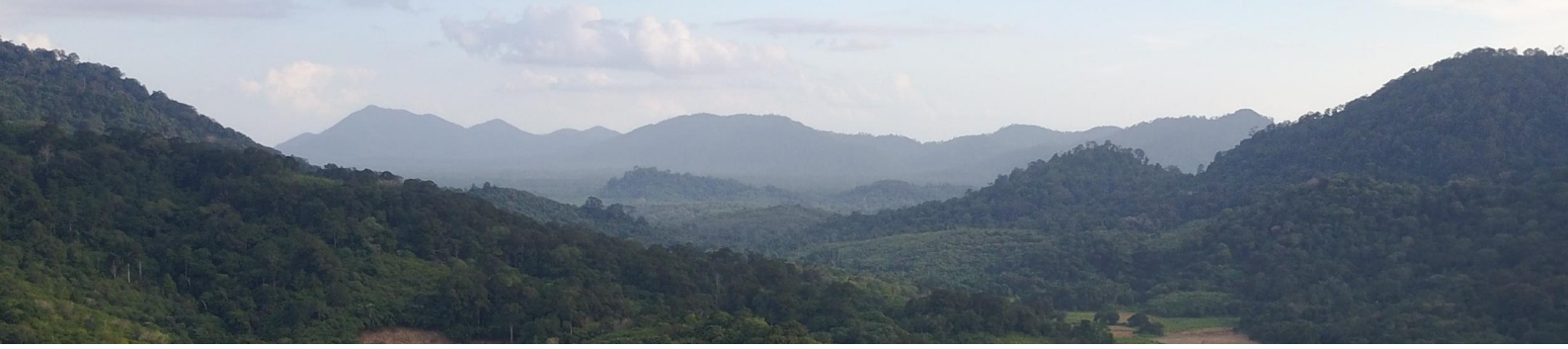


Figure 3. (a) Land uses in 2016 that replaced forest cover in 2000; (b) Historical land uses of oil-palm plantations in 2016



HCV area changes over 16 years (2000-2016)

For further conservation and protection in this dynamic landscape, evidence from land use/cover changes needs to be strengthened by the assessment of HCVs, that is based on clear criteria on biodiversity and other environmental values [5-6]. In 2016, HCV areas covered 239,595 ha, distributed mainly in the National Park (Gunung Palung National Park (GPNP)), Protection Forests (Hutan Lindung) and parts of peatland ecosystems in the landscape (81% of total HCV area); 5% was located inside OPMUs; and the remaining 14% was distributed in other parts of the landscape. Compared to HCV areas in 2000 (330,342 ha), there was a decrease of 28% in 16 years, with the largest loss taking place in non-state-forest land (Areal Penggunaan Lain) (72,000 ha or 64% decrease) (Figures 4 and 5(a)). The second largest loss was in Production Forest (12,000 ha or 16% decrease) although in terms of percentage the loss in Protection Forest was the second highest (22%, 5000 ha).

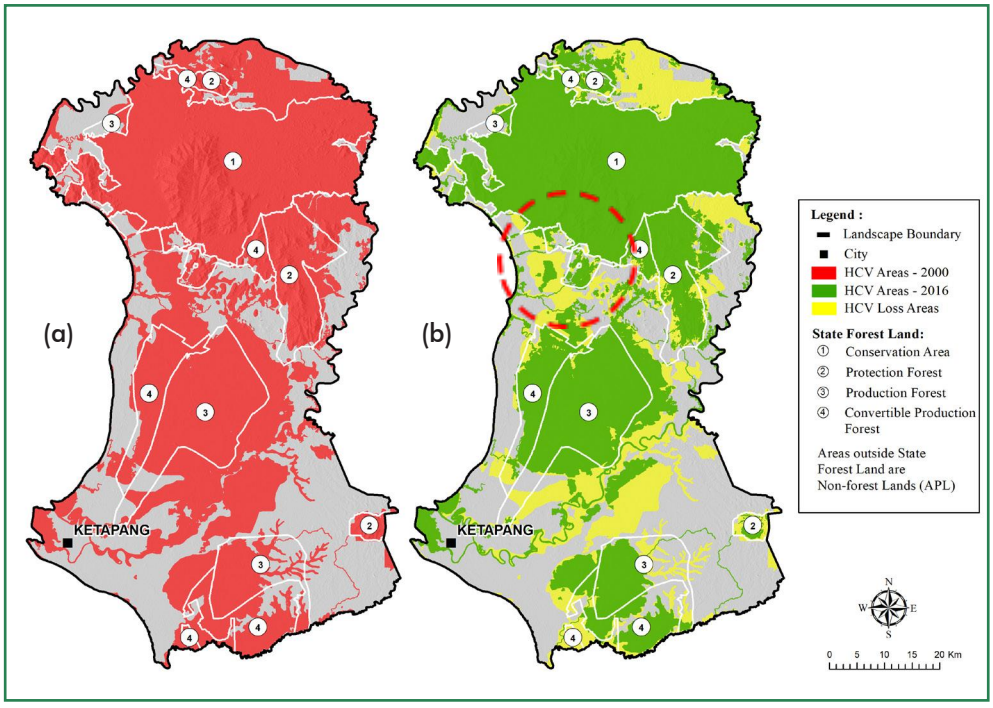


Figure 4. (a) Total areas identified as HCVs for 2000 (red); (b) HCV areas in 2016 (green) and the HCV-loss areas (yellow); red circle showing disconnection owing to HCV loss

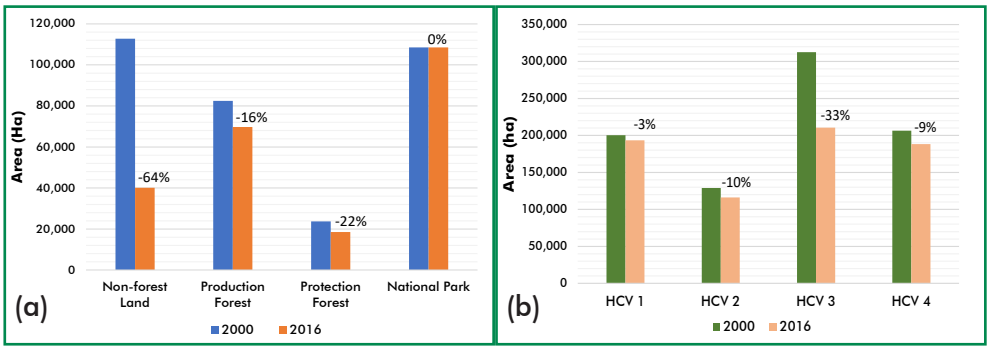


Figure 5. HCV loss and percentage of loss between 2000 and 2016 for (a) each designated state-forest land and non-state-forest land; and (b) each HCV area in the landscape

The largest HCV in 2000 was HCV 3 ('Rare and Endangered Ecosystems'), which were dominated by peat-swamp and dipterocarp forest ecosystems. HCV3 showed the largest loss over the 16 years (33%) (Figure 5b), owing to the loss of forests in those ecosystems. There were only slight decreases for the other HCVs: 10% for HCV 2 ('Natural Landscape and Dynamics'), 9% for HCV 4 ('Environmental Services') and 3% for HCV 1 ('Areas with Biodiversity Importance') (Figure 5(b)).

HCV loss in GTL caused disconnection across forested areas, and one important gap was created in the central part of the landscape, between major ecosystems of GPNP-GTPF and SPFB (circle in Figure 4 (b)). HCV loss in other parts, including around Pawan River (in the south of GTL), also demonstrates fragmented forest areas and substantial decrease of forest patch size.

Loss of landscape HCV in OPMUs

There were 16 OPMUs in GTL in 2016, most of which were established in the mid-2000s; a few were established in the 1990s. Changes of landscape HCVs were assessed inside the boundaries of OPMUs in 2016, primarily to observe HCV before most of the OPMUs were established (year 2000) and after approximately 10 years of establishment (year 2016).

HCV areas located inside OPMUs covered 13,000 ha or approximately 5% of the 239,596 ha of HCV areas in 2016, with a variation of 1–55% of OPMU coverage.

Loss of HCV areas inside OPMUs during 2000–2016 ranged 23–100%; the latter meaning that the HCV area was completely removed inside the OPMU. Twelve OPMUs showed substantial HCV-area decrease (>60%); these same OPMUs were advanced in their plantation development (>50% concession area planted with oil palm by 2016). These figures strongly indicate that many areas with conservation values in 2000 were lost owing to oil-palm development. Moreover, development of OPMUs led to the loss of ecological connections between key forest areas (see Figures 4(b) and 6).

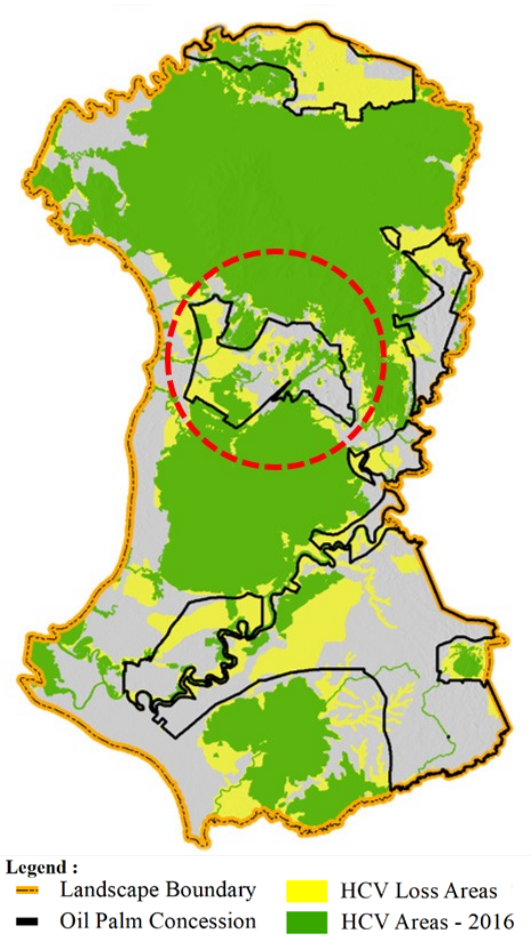


Figure 6. Landscape HCV areas with the OPMU coverage (areas bordered by black lines) in 2016 and the loss during 2000–2016

The remaining landscape HCV areas in 2016 were compared against the baseline of 2000 to observe the extent of HCV areas maintained by the current OPMUs. Analyses of the 12 OPMUs in GTL[1] resulted in a pattern, shown in Figure 7.

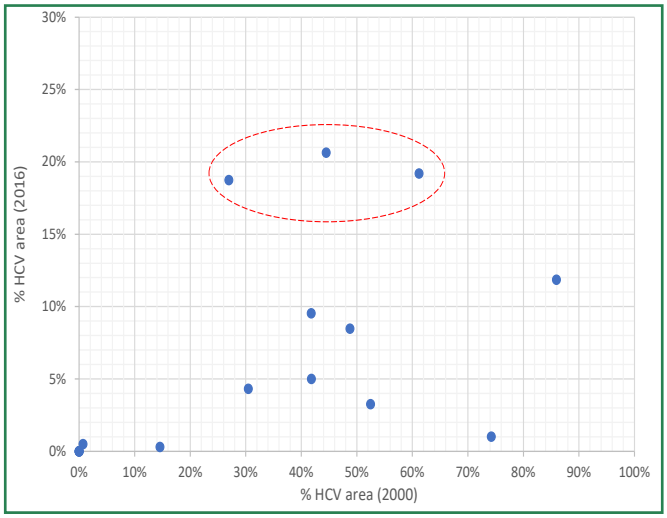


Figure 7. Relationship between % HCV area of 2016 and % HCV baseline of 2000 inside OPMU boundaries

The graph shows that landscape HCV in 2000 occupied 1–86% of the OPMU areas, with most (8 out of 12) having a medium level of HCV areas (30–60% of OPMU areas). The maintenance of HCV areas by 2016 was mostly (8 out of 12) very low, i.e. <10% HCV areas, regardless of the baseline. There were three OPMUs that maintained HCV areas much larger than the other nine (±20%, shown by the ellipse in Figure 7), and these OPMUs had a medium baseline in 2000. Consequently, these three OPMUs can be categorised as demonstrating the best practice in HCV area maintenance. Two of these OPMUs are members of the Roundtable on Sustainable Palm Oil (RSPO) and have identified and published HCVs in their management areas, which presumably explains the good maintenance of their HCV areas.

This analysis demonstrates the extent of HCV areas maintained by the OPMUs in GTL by 2016 in comparison to the extent of the baseline. Currently operating OPMUs are not always responsible for losses during 2000–2016 because there were variations in OPMUs' establishment years, concession ownership and exact years of clearance.

1 *We took into account OPMUs with ≥50% areas inside GTL in order to be close to the overall picture of the OPMUs. Therefore, only 12 OPMUs became part of this analysis while four other OPMUs, with <50% area inside GTL, were excluded.*

Conclusions

Land-use development has consequences on the loss or decrease of ecologically important areas, which have further consequences on the loss of functions that are important for human life and the environment. The identification and management of HCVs can integrate conservation efforts in production landscapes without totally cancelling production practices, even though HCVs are obviously at the expense of areas potentially for production in the management units. The HCV concept and approach have evolved to incorporate these conservation efforts by reconciling conservation and production objectives at a landscape scale.

GTL is an example where loss of natural ecosystems has been massive owing to land-use development, primarily in the form of oil-palm plantations, which started mostly in the early 2000s. Therefore, identification and reinforcement of HCVs at landscape level is highly relevant as a strategy to protect remaining conservation values in this highly modified landscape.

The findings demonstrate that in 2016, HCV areas were concentrated in the National Park (Gunung Palung National Park (GPNP)), Protection Forests (Hutan Lindung) and parts of peatland ecosystems. HCV area loss between 2000 and 2016 was mainly owing to the loss of forests, which were heavily logged and later converted into agro-commodities areas, such as for oil palm. HCV areas in 2000 (before large expansion of OPMUs took place) mostly covered moderate proportions inside OPMU boundaries; after 16 years, the maintenance of landscape HCV areas was mostly low. However, a number of OPMUs seemed to demonstrate efforts in conservation and/or commitment to sustainable practices because they maintained relatively larger areas of HCVs compared to the rest.

The fragmentation of HCV areas in GTL resulted in gaps and disconnections in some parts of the landscape. An application of HCV demarcation and management at landscape level can be an important strategy to restore connections between fragmented forest areas and increase the viability of plant and animal populations.

Loss of landscape HCV in OPMUs

Identification of HCV areas at the landscape scale can serve as an initial process or reference for development of conservation and protection plans, such as for ecological corridors. From the identified landscape HCV areas in GTL, existence of gaps between major ecosystems (GPNP-GTPF and SPFB) demonstrates the need for ecological corridor development. Landscape HCV is also potential as an entry point for more detailed HCV identification, e.g. at management unit level. HCV identification at management unit level will complement landscape HCV and will provide elaboration of HCV on the ground for operationalisation and implementation.

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This Info Brief is part of a publication series by Tropenbos Indonesia that is based on studies and discourses on Landscape HCV. The series showcases findings from a case study in West Kalimantan and the relevance of Landscape HCV for various planning and safeguards in Indonesia.

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